TETRA TECH, INC.

December 27, 2005

Mr. Dave Todd
Supervising Land and Water Use Analyst
Office of Water Use Efficiency
Post Office Box 942836
Sacramento, CA 94236-0001

Dear Mr. Todd:

On behalf of the City of Rio Vista we are pleased to provide you with a copy of the adopted 2005 Urban Water Management Plan. If you have any questions please contact Brent Salmi at:

City of Rio Vista City Hall
One Main Street
Rio Vista, CA 94571
(707) 374-6451

Alternatively, you may contact me at the number listed below.

Sincerely,

Brian Lee,
Project Manager
Tetra Tech, ISG

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Enclosure

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CITY OF RIO VISTA

2005
URBAN WATER MANAGEMENT PLAN

PREPARED FOR

CITY OF RIO VISTA
PUBLIC WORKS DEPARTMENT

PREPARED BY

TETRA TECH, INC.

DECEMBER 2005

Table of Contents

Table of Tables

1. Agency Coordination

1.1. The City of Rio Vista as an "Urban Water Supplier"

The City of Rio Vista (City), as defined in the California Water Code section 10617, qualifies as an "Urban Water Supplier". The City is a public agency directly providing water for municipal purposes to more than 3,000 customers. As such, the City is required to complete an Urban Water Management Plan (UWMP) every five years. This is the first UWMP the City has filed with the State.

The preparation of the City's 2005 UWMP was contracted to Tetra Tech Inc. as provided for in the California Water Code section 10620, paragraph (e). The 2005 UWMP has been prepared in conformance with the California Urban Water management planning act, California water code division 6, part 2.6, Urban Water Management Planning.

1.1.1. Public Participation

A public hearing to discuss and receive comments regarding the City's 2005 UWMP was held at the December 15, 2005 City Council Meeting. The 2005 UWMP was made available for public review at the Public Works Department at Rio Vista City Hall.

The Rio Vista City Council adopted the 2005 UWMP by resolution at its December 15, 2005 Council Meeting.

1.1.2. Agency Coordination

During the preparation of the 2005 UWMP, the City coordinated information with Solano County and the Solano County Water Agency (Table 1).

Table 1 - Coordination with Appropriate Agencies

	Attended public meetings	Contacted for assistance	Received copy of draft	Sent notice of intention to adopt
Solano County		X	X	X
Solano County Water Agency		X	X	X

1.1.3. Resource Maximization / Import Minimization Plan

The City currently produces all of its potable water from local wells. A recent study commissioned by the City indicates that local groundwater sources are sufficient for planned demands[1]. The City recognizes that long term management of the groundwater will be required to ensure a safe and sufficient water supply.

2. UWMP Contents

2.2. Service Area Information with 20 year projections

2.2.1. The City of Rio Vista

The City of Rio Vista (The City) is located 48 miles southwest of Sacramento and 65 miles northeast of San Francisco. The City was incorporated on December 30, 1893. There are currently 4,225 acres of land within the City's water service boundary, of which 2,153 is currently developed. The City anticipates full build-out by the year 2020.

The City includes a mix of rural and suburban lifestyles and easy access to the urban amenities of San Francisco and Sacramento. Rio Vita lies on the banks of the Sacramento River and is within an easy drive to the Napa Wine Country, Sierra ski resorts and Lake Tahoe.

In addition to the town proper, the City's Planning Area includes unincorporated surrounding areas located within the City's sphere of influence. These unincorporated areas may, in the future, request services from or annexation to the City. The City's full planning area includes approximately 6,455 acres of unincorporated land.

2.2.2. Population

Historical and projected population is shown in Table 2. Between 2005 and 2020 the City's population is expected to triple. Based on information in the City's 2001 Master Plan, build-out is expected to occur in the year 2020.

Table 2 - Population, Current and Projected

	2000	2005	2010	2015	2020	2025
Service Area Population	4,571	6,837	13,179	18,237	21,980	21,980

Solano County requires that any urban development be annexed to a city (Solano County Orderly Growth Initiative, 1994). There are no urban populations in the unincorporated areas of Solano County. This initiative will continue to place annexation

[1] *Groundwater Evaluation, City of Rio Vista, California, June 21,2002*, Prepared by Engeo Corporated

pressure on the City as undeveloped areas in the City's sphere of influence continue to develop.

2.2.3. Climate Characteristics

Table 3 shows climatic information. The average rainfall and average temperature information comes from the National Weather Service from the Antioch Pump Plant 3 data center (period of record 1955 – 2005). The evapotranspiration data comes from the Twitchell Island California Irrigation Management Information System (CIMIS) Station.

Table 3 - Climate

	Jan	Feb	Mar	Apr	May	Jun	
Standard Monthly Avg. ETo	1.59	2.20	3.66	5.08	6.83	7.80	
Avg Rainfall (inches)	2..80	2.43	1.93	0.88	0.38	0.10	
Avg Temp (F)	45.3	50.6	54.4	58.8	64.85	71.1	
	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Standard Monthly Avg. ETo	8.67	7.81	5.67	4.03	2.13	1.59	57.06
Avg Rainfall (inches)	0.02	0.05	0.21	0.70	1.66	2.12	13.28
Avg Temp (F)	74.1	73.4	70.7	63.9	53.5	45.9	60.5

2.3. Water Sources

The City has six operating supply wells providing water for the entire system. Supplemental water sources include the Sacramento River and the North Bay Aqueduct (NBA). An agreement with the Solano County Water Agency, which controls the NBA water in Solano County, allows for access to the NBA supplemental water source. However, because Rio Vista is a significant distance from the NBA facility, it is more likely the City would trade its rights to that water for additional Sacramento River water if needed. Future water sources may include additional wells, recycled water, the Sacramento River, and purchased water from the Solano County Water Agency.

Table 4 - Current and Planned Water Supplies - AF/Y

Water Supply Sources	2005	2010	2015	2020	2025
Supplier produced groundwater	2,446	5,218	7,119	8,184	8,184
Total	2,446	5,218	7,119	8,184	8,184

2.3.1. Groundwater Source - Sacramento Valley Groundwater Basin

The City draws its water supply from the Solano Sub-basin at the southeastern limit of the Sacramento Valley Groundwater Basin. The Solano Subbasin is defined by Putah Creek on the north, Sacramento River on the East, the North Mokelumne River on the southeast, and the San Joaquin River on the South. Average annual precipitation in the basin ranges from 23-inches in the western portion of the Subbasin to 16-inches in the eastern portion of the basin. The groundwater basin is currently not adjudicated.

The City commissioned *ENGEO Incorporated* to prepare the 2002 report *Groundwater Evaluation for Rio Vista*. The report reevaluated the groundwater basin in and around the City limits to help determine the future capability of providing water for existing and planned developments. The report concludes that the groundwater basin will likely meet the future groundwater demands established by the projected population growth for the next 20 years. Monitoring the static and pumping levels of the wells in order to better understand the impacts of the increased demand on the aquifer is recommended.

California Bulletin 160, *California Water Plan Update 2005* provides no indication that the basin is in overdraft conditions. Bulletin 160 focuses on Bay Delta issues and water quality. California Bulletin 116 discusses the Solano Subbasin in detail. There is currently no calculated groundwater budget for the Solano Subbasin.

Table 5 - Historical Groundwater Pumped

Basin Name	2000	2001	2002	2003	2004
Sacramento Valley Groundwater Basin	1,620	1,645	1,670	1,695	1,718
% of Total Water Supply	100	100	100	100	100

Table 6 - Projected Groundwater Pumping

Basin Name	2005	2010	2015	2020	2025	2030
Sacramento Valley Groundwater Basin	2,446	5,218	7,119	8,184	8,184	8,184
% of Total Water Supply	100	100	100	100	100	100

2.3.2. Recycled Water

The City currently does not have a recycled water treatment plant. Potential recycled water customers exist in the City and surrounding areas. Agriculture would be the largest potential customer, giving way over time to green belts and common areas as development continues to occur.

To provide recycled water the City would have to construct a recycled water treatment plant and the infrastructure necessary to convey the recycled water to customers.

At this time the City's economic plans do not include the financial resources needed to implement a recycled water system.

2.4. Reliability of Water Supply

The City has a single source of water, the Solano Groundwater Subbasin, historically used since incorporating in 1893. A groundwater management plan has not been prepared for the Solano Groundwater Subbasin.

Groundwater levels in the subbasin are impacted by periods of drought due to increased groundwater pumping and less surface water recharge (e.g. in the late 1970's). The subbasin does recover quickly in "wet" years. Historical trends indicate that water levels in the subbasin are not in decline.

Historically, the City's supply has matched demand during single-year and extended-period droughts. Because the groundwater basin does not have a water budget and the City is in such a rapid development period this report will use the 'ultimate build-out' demand forecast of 8,184 acre-feet per year for a 'normal' water year' supply amount. Based on historical pumping records the City is confident that demands can continue to be met with local groundwater.

Because the groundwater basin has not been fully defined and there is no calculated groundwater budget, the nearest recorded potential water source (The Sacramento River) was used to determine the normal year, dry year and multiple dry year periods. Records of flow from the USGS Sacramento River Gauge 11447500 provide the Normal, Single Dry, and Multiple Dry year data as shown in Table 8. Unfortunately, City demand records during those periods are unavailable. Therefore, demand during drought periods is calculated as follows:

- It is assumed that under normal conditions water demand doubles during the summer months. Therefore, summer water demand accounts for 2/3 of the total yearly demand.
- It is also assumed that summer demand doubles during drought conditions. This is a highly conservative assumption, as the City does not have large swaths of greenbelts or large irrigation customers.
- Using the two assumptions above results in a yearly drought demand that is 33% higher than normal demand.

Table 7 - Supply Reliability - AF Year

Multiple Dry Water Years					
	Normal Water Year	Single Dry Water Year	Year 1	Year 2	Year 3
Sacramento Valley Groundwater Basin, Solano Subbasin	8,184	10,912	10,912	10,912	10,912
% of Normal	100	133	133	133	133

Table 8 - Basis of Water Year Data

Water Year Type	Base Year(s)
Normal Water Year	1954
Single-Dry Water Year	1977
Multiple-Dry Water Years	1976-1978

Table 9 - Describe the Factors Resulting in Inconsistency of Supply

Name of supply	Legal	Environmental	Water Quality	Climatic
Sacramento Valley Groundwater Basin	none	none	none	drought

2.5. Transfer and Exchange Opportunities

Being surrounded by agricultural land, there are no active municipal water supply systems located adjacent to the city. Transfer and exchange opportunities are, therefore, limited.

As a member of the Solano County Water Authority, the City of Rio Vista eventually will hold rights to 1,500 acre feet of water from the North Bay Aqueduct project (NBA). The NBA is scheduled to begin water deliveries in 2016.

The location of the NBA makes it unlikely that the City will use NBA water directly. The cost to construct transmission facilities is too great. The possibility exists of an agreement to transfer water rights with the Solano County Water Agency for use of surface water from the Sacramento River in place of water from NAB. Such agreement, if needed, would likely be short-term during a significant dry weather period.

Table 10 - Transfer and Exchange Opportunities - AF/Year

Source Transfer Agency	Transfer or Exchange	YEAR				
Solano Water Authority	Exchange	2016	2017	2018	2019	2020
Quantity (AF/ yr)		300	600	900	1,200	1,500

2.6. Water Use by Customer-type – Past, Current, and Future

Residential consumption was, is, and will continue to be the primary consumer of water within the District. The remaining supply is used for commercial and governmental functions within the City.

Currently there are no existing sales of water to other agencies and there are no plans to sell water to other agencies. There are no additional water losses or usages for saline barriers, groundwater recharging or water recycling. All losses that occur are considered unaccounted for system losses. The City does not currently have the resources to establish a program for determining system losses.

Table 11 - Past Water Deliveries

Water User Classification	Demand (af)				
	2000	2001	2002	2003	2004
Single-Family Residential	1,205	1,224	1,243	1,261	1,278
Multi-Family Residential	36	36	37	37	38
Commercial	92	93	95	96	98
Industrial	90	91	93	94	96
Institutional	68	69	70	71	72
Park	24	24	25	25	25
Landscape Irrigation	105	107	109	110	112
Total (af)	1,620	1,645	1,670	1,695	1,718
Total (mgd)	1.45	1.47	1.49	1.51	1.53

Table 12 - Current and Projected Water Deliveries

Water User Classification	Demand (af)				
	2005	2010	2015	2020	2025
Single-Family Residential	1,820	3,586	4,836	5,555	5,555
Multi-Family Residential	54	116	289	475	475
Commercial	139	354	461	499	499
Industrial	136	487	506	506	506
Institutional	102	158	201	201	201
Park	36	119	208	208	208
Landscape Irrigation	159	398	617	740	740
Total (af)	2,446	5,218	7,119	8,184	8,184
Total (mgd)	2.18	4.66	6.36	7.31	7.31

2.7. Demand Management Measures (DMMs)

Demand Management Measures are ways to conserve water through efficient tools, education, and incentives. Currently there are 14 best management practices (BMPs) that are promoted by California Urban Water Conservation Council (CUWCC). The City is not a current signatory to the California Urban Water Conservation Council. However, the City is a member of the Solano County Water Agency, who is a signatory of the CUWCC.

Each of the BMPs is discussed in this section to determine the current state of implementation by the City (if applicable).

2.7.1. Water Survey Programs for Residential Customers

The City has not developed an independent survey program of single or multifamily residential customers to detect leaks. The City may consider beginning a water survey program to increase the visibility of the Public Works services. Such information could be supplied as a leaflet in the monthly water bill.

2.7.2. Residential Plumbing Retrofit

This City does not have a retrofit program.

2.7.3. System Water Audits

The City has an informal manner of reviewing the status of the water system. City employees are highly knowledgeable about the existing system. The 2003 Water

Supply and Delivery System Master Plan suggested a maintenance program. The City has been successful in continually repairing leaking mains in a timely fashion.

2.7.4. Commodity Rate Metering

The city currently does not meter the water usage of residential user. However, in the new development in the Trilogy Area are water meters installed. The City is in the process of releasing a Request for Proposals to complete a comprehensive water and wastewater fees study. In the 2003 Water Master Plan the City is recommended to review the fiscal impacts of establishing a meter installation and reading program which would ultimately result in a more efficient water use system, and reduce the projected strain on the groundwater aquifers.

2.7.5. Large Landscape Conservation

The City does not have a Large Landscape Conservation program.

2.7.6. High Efficiency Washing Machines

The City may consider participating in a regional program that provides Residential High-Efficiency Clothes Washer Vouchers. More information about this potential needs to be provided.

2.7.7. Public Information Programs

The City provides information to the public on a regular basis through the use of the City's internet homepage, mailings, and public meetings.

2.7.8. School Education Programs

This City does not have a School Education program.

2.7.9. Conservation Programs for Commercial, Industrial, and Institutional Accounts

This City does not have a Conservation Program for Commercial, Industrial and Institutional Accounts.

2.7.10. Conservation Pricing

This City does not have a Conservation Pricing program.

2.7.11. Wholesale Agency Programs

This City is not a Wholesale Agency.

2.7.12. Water Conservation Coordinator

This City does not have a Water Conservation Coordinator program.

2.7.13. Water Waste Prohibition

This City does not have a waste Water Prohibition program.

2.7.14. Residential Ultra-Low Flush Toilet Replacement Programs

This City does not have a Residential Ultra-Low flush toilet Replacement program.

2.8. Evaluation of DMMs not implemented

Due to its relatively small size and agricultural history, management of the City's water system has focused on delivery. It is only in the last decade that the City's population passed 3,000.

With the recent influx of residential customers the City is adapting to its new role as an urban water supplier. The City recognizes the important roll conservation plays in ensuring a reliable water supply. Historically, the City has not metered residential customer accounts. New residential developments constructed since 2005 are required to install water meters. The City is working to begin installing meters on old un-metered accounts.

The City is at the beginning stages of developing a water conservation program. Shortly, the City will complete a comprehensive water and wastewater fee study. This study will lay the framework for future conservation measures.

BMPs not directly implemented by the City are carried out by the Solano County Water Agency, of which the city is a member.

2.9. Planned Water Supply Projects and Programs

The City is projected to meet its current and future water supply needs through existing and future wells.

2.10. Development of Desalinated Water

The City is not located adjacent to a supply of water high in total dissolved solids (TDS) that would warrant desalination.

2.11. Current or Projected Wholesale Water Supplies

The City does not currently, not does it project to use wholesale water.

3. Determination of DMM Implementation

The City is a participating member of the Solano County Water Agency. The Solano County Water Agency 2005 UWMP includes the most recent Annual Report submitted to CUWCC.

4. Water Shortage Contingency Plan

The City does not currently have a Water Shortage Contingency ordinance requiring customer action or penalties due to noncompliance. The City does not anticipate future water shortages due to supply limitations.

Table 13 - Three-Year estimated Minimum Water Supply - AF/Year

Source	Year 1	Year 2	Year 3	Normal
Solano Subbasin	8,184	8,184	8,184	8,184

Because the district uses groundwater exclusively for its supply, catastrophic supply interruptions are unlikely. A reasonable supply interruption scenario would be a regional power outage. In that event, the City has back-up generators at the well sites to provide the necessary power for continued well operation.

5. Recycled Water Plan

The City does not have an independent recycled water plan. The size of the City, the distance between potential recycled water customers, the treatment facilities needed, and the economic impacts of implementing a recycled water distribution system do not make recycled water feasible at this time.

6. Water Quality Impacts on Reliability

Water quality from the Solano Subbasin is good and is not expected to deteriorate in the foreseeable future. The City does not anticipate that water quality will affect water management strategies and supply reliability.

7. Water Service Reliability

7.1. Projected Normal, Single-Dry, and Multi-Dry Years Water Year Supply and Demand

The Solano Subbasin is not recognized as being in significant overdraft. Currently, the City is expecting that groundwater supplies will be sufficient to serve the ultimate population. Supply and demand estimates are discussed more fully in Section 2.4 on Page 5 of this report.

Table 14 – Projected Normal Water Year Supply and Demand – AF/Y

	2010	2015	2020	2025
Solano Subbasin Supply	8,184	8,184	8,184	8,184
City Demand	5,218	7,119	8,184	8,184
% of Normal Year	64%	87%	100%	100%

7.2. Projected Singe-dry Year Supply and Demand Comparison

Table 15 – Projected Single dry Year Water Supply and Demand – AF/Y

	2010	2015	2020	2025
Solano Subbasin Supply	6,956	9,490	10,912	10,912
City Demand	6,956	9,490	10,912	10,912
% of projected Normal	133%	133%	133%	133%

Demand and supply match each-other on a one-for-one basis during single and multi-year drought conditions. Projected multiple-dry year supply and demand comparisons are identical to those presented in Table 15.

8. Adoption and Implementation of UWMP

The Act requires each urban water supplier to adopt and implement their UWMP once every five years. The process involves public review of the UWMP, revisions, and adoption by the governing body of the agency. The City's 2005 draft UWMP shall be reviewed by the City Council and general public during a public review meeting. The draft shall be revised as needed to address comments and concerns prior to adoption by the City Council. Once adopted by the City, the UWMP shall be submitted to the Department of Water Resource.

9. APPENDIX – City Resolution Adopting the 2005 UWMP

RESOLUTION 2005-150

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF RIO VISTA APPROVING THE URBAN WATER MANAGEMENT PLAN

WHEREAS, the State of California requires that an Urban Water Management Plan also be prepared; and

WHEREAS, Tetra Tech, Inc. has prepared an Urban Water Management Plan in accordance with applicable State requirements; and

WHEREAS, the City Council acknowledges that minor clarifying changes may be required prior to submission of the Urban Water Management Plan to the State of California.

NOW THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF RIO VISTA that said Council does hereby approve the Urban Water Management Plan, subject to minor clarifying changes as may be approved by the City Public Works Director and City Manager.

PASSED, APPROVED, AND ADOPTED this fifteenth day of December 2005 by the following roll call vote:

AYES: COUNCILMEMBERS	Bhakta, Jones, Kelly, Vick, Woodruff
NOES: COUNCILMEMBERS	
ABSENT: COUNCILMEMBERS	
ABSTAIN: COUNCILMEMBERS	

ATTEST:

Margaret Roberts

Margaret Roberts, CMC
City Clerk of the City of Rio Vista